

WHAT IS CLAIMED IS:

1. A pharmaceutical composition comprising the alpha chain of hemoglobin in a pharmaceutically acceptable carrier.
2. A pharmaceutical composition comprising the beta chain of hemoglobin in a pharmaceutically acceptable carrier.
3. A pharmaceutical composition as in claim 1 further comprising the beta chain of hemoglobin.
4. A pharmaceutical composition as in claim 1-3 in unit dosage form.
5. A pharmaceutical composition as in claim 4 comprising 0.1 mgs. to 6 gms. of the alpha and/or beta chain of hemoglobin.
6. A method of inhibiting stem cell proliferation comprising contacting hematopoietic cells with a stem cell proliferation inhibiting amount of INPROL.
7. A method as in claim 6 wherein said INPROL is selected from the group consisting of the alpha chain of hemoglobin and the beta chain of hemoglobin.
8. A method of stimulating the growth of B cells which comprises contacting hematopoietic cells with a growth stimulating amount of INPROL.

9. A method of treating cancer in a mammal suffering therefrom comprising the steps of:

- a) administering radiotherapy or chemotherapy, and
- b) administering a stem cell proliferation inhibiting amount of INPROL

10. A method as in claim 9 wherein steps a and b are repeated one or more times.

11. A method as in claim 9 wherein step a is conducted after step b.

12. A method as in claim 9 wherein step b is conducted within 24 hours before or after step a.

13. A method for treating cancer in a mammal comprising:

- a) removing bone marrow from said mammal,
- b) treating said bone marrow *ex vivo* with INPROL,
- c) treating said bone marrow of step b with chemotherapy or radiation,
- d) performing myeloablative treatment on said mammal, and
- e) transplanting into said mammal the bone marrow of step c.

14. A method as in claim 13 wherein said cancer is leukemia.

15. A method of inhibiting stem cell division in a mammal exposed to an agent which damages or destroys stem cells undergoing division comprising administering a stem cell proliferation inhibiting amount of INPROL.

16. A method as in claim 15 wherein said agent is an antiviral agent.

17. A method of maintaining mammalian hematopoietic stem cells *ex vivo* comprising contacting hematopoietic cells with a stem cell proliferation inhibiting amount of INPROL.

18. A method as in claim 17 wherein said hematopoietic cells are selected from the group consisting of bone marrow cells, peripheral blood cells and cord blood cells.

19. A method of treating a myeloproliferative or autoimmune disease or epithelial stem cell hyperproliferation in a mammal suffering therefrom comprising administering a hyperproliferative reducing amount of INPROL.

20. A method as in claim 19 wherein said myeloproliferative disease is a myelodysplastic syndrome.

21. A method for differentially protecting normal stem cells and not cancer cells in a mammal from chemotherapy or radiation comprising administering a stem cell protecting amount of INPROL.

22. A method as in claim 21 wherein said INPROL is administered after said normal stem cells are induced to proliferate by exposure to a cytotoxic drug or radiation.

23. A method of vaccinating a mammal comprising administering INPROL as an adjuvant before, during or after administration of a vaccine.

24. A method of purifying an inhibitor of stem cell proliferation substantially free from other proteinaceous material comprising the following steps:

- a) isolating bone marrow and removing particulate matter from an extract;
- b) heating said extract and removing precipitate;
- c) acid precipitating said extract and collecting precipitate; and
- d) isolating said inhibitor by reverse phase chromatography.

25. A purified inhibitor of stem cell proliferation wherein said inhibitor is purified to apparent homogeneity by the method of claim 24.

26. A method of treating a mammal having immunodepression caused by stem cell hyperproliferation comprising administering to said mammal an hyperproliferation reversing amount of INPROL.